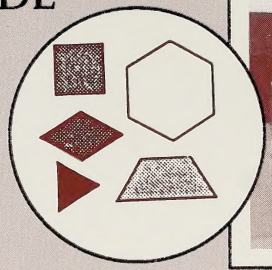
University of Alberta Library
0 1620 3681836 5

# RATIO and PROPORTION

## MODULE 5

## STUDENT SUPPORT GUIDE



# *MATHEMATICS 7*

Distance Learning

Alberta EDUCATION

CANADIANA
AUG 26 1992

# Mathematics 7

## Module 5: Ratio and Proportion

## STUDENT SUPPORT GUIDE

## Note to the Parent or Guardian

**This Mathematics Student Support Guide contains answers to activities in the accompanying Module Booklet. It should be kept secure by the parent or guardian if the student is under 16 years of age. Younger students should not have access to this Guide except under supervision.**

**This Student Support Guide does not contain the answers to the accompanying Assignment Booklet. The Assignment Booklet will be graded by the student's distance education teacher.**

Mathematics 7
Student Support Guide
Module 5
Ratio and Proportion
Alberta Distance Learning Centre
ISBN No. 0-7741-0156-3

**ALL RIGHTS RESERVED**

Copyright © 1991, the Crown in Right of Alberta, as represented by the Minister of Education, Alberta Education 11160 Jasper Avenue, Edmonton, Alberta, T5K 0L2.
All rights reserved. Additional copies may be obtained from the Learning Resources Distributing Centre.

No part of this courseware may be reproduced in any form including photocopying (unless otherwise indicated), without the written permission of Alberta Education.

Every effort has been made both to provide proper acknowledgement of the original source and to comply with copyright law. If cases are identified where this has not been done, please notify Alberta Education so appropriate corrective action can be taken.

UNIVERSITY LIBRARY

# CONTENTS


| | Page |
|---|---|
| Module Introduction | 1 |
| Section 1: Getting Set | 3 |
| Section 2: Ratios | 9 |
| Section 3: Equivalent Ratios | 19 |
| Section 4: Comparing and Ordering Ratios | 29 |
| Section 5: Finding a Missing Term in a Proportion | 39 |
| Section 6: Summary | 49 |
| Section 7: Getting Set | 51 |
| Section 8: Percents | 59 |
| Section 9: Fractions, Decimals and Percents | 67 |
| Section 10: Finding a Percent of a Number | 79 |
| Section 11: Summary | 91 |
| Module Conclusion | 93 |

Digitized by the Internet Archive
in 2016 with funding from
University of Alberta Libraries

https://archive.org/details/mathematics705albe_1

## Acknowledgements

### Project Manager

Linda Cox, Alberta Distance Learning Centre (formerly Alberta Correspondence School)

### Curriculum Validator

Merv Lastiwka, Edmonton Public Schools District No. 7

### Contributors

Lynda Antoniuk, Edmonton Public Schools District No. 7
Sharon Kratky, Edmonton Public Schools District No. 7
Susan Ludwig, Edmonton Roman Catholic Separate School District No. 7
Carolyn Martin, Edmonton Roman Catholic Separate School District No. 7
Bill Peterson, Alberta Distance Learning Centre
Richard Robinson, Alberta Distance Learning Centre
Bryan Sosnowski, Edmonton Public Schools District No. 7
Jim Williams, Edmonton Public Schools District No. 7
Rod Buga, Edmonton Roman Catholic Separate School District No. 7
Ralph Lee, Edmonton Public Schools District No. 7
Wendy Lukawesky, Edmonton Public Schools District No. 7
Dennis McCarthy, Alberta Distance Learning Centre
Lucy Piard, Alberta Distance Learning Centre
Joe Symak, Alberta Distance Learning Centre
Peter Tymkow, Alberta Distance Learning Centre
Marie Hauk, University of Alberta

# MODULE INTRODUCTION

## What Lies Ahead

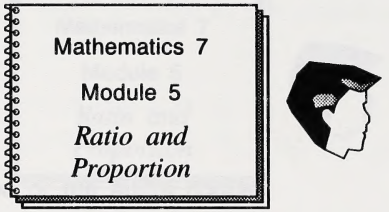
In this module the student will learn about ratios and percent.

Sections 1 to 6 deal with ratios.

Sections 7 to 11 deal with percent.

## Gathering Materials

For the Module Introduction the student will need the following item:




## Guiding the Student

- Have the student preview the Module Booklet.
- Have the student read the Module Introduction in the Module Booklet. Then discuss with the student how the module will be evaluated.

## The Learning Process

Each section of Module 5 deals with a different skill involving whole numbers or integers.

Sections have several activities.

- Introductory Activities
- Practice Activities
- Extra Practice
- Concluding Activities

Remind the student that he/she will not be expected to do all the activities. You will help him/her decide what to do.

## Time Management

Decide how long the student will need to complete the module. (The average student should spend about 5 weeks or 12.5 hours to complete the module. It is recommended that students spend no more than 1 hour at a time doing mathematics.)

## Evaluation

Explain that the grade on Module 5 is based on work in the assignment booklet. The module booklet will help prepare the student for the assignment booklet.

Module 5 is worth 10%.

Discuss the evaluation of the entire course.

# GETTING SET

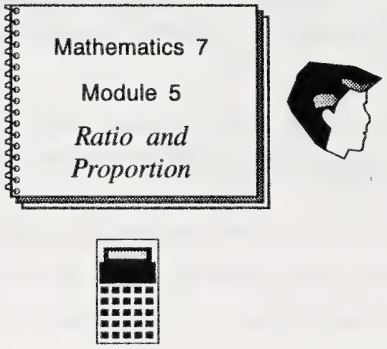
## What Lies Ahead

This section tests these skills:

- interpreting a ratio
- writing a ratio using colon form and fraction form
- writing equivalent ratios
- writing ratios in simplest form
- comparing and ordering ratios
- writing a proportion
- finding the missing term in a proportion

## Gathering Materials

For this section the student will need these items




## Guiding the Student

- Have the student turn to Section 1 in the Module Booklet and read the "What Lies Ahead" box and "Working Together."
- Next have the student do the pretest. This will help you decide what the student should do next.
- Afterwards help the student check the answers. It may not be necessary for the student to correct errors. See the last page of this section for further directions.

## Pretest

1. Write statements using these ratios to compare the number of objects in the diagram.

   a. 2 to 5

   b. 5 to 7

2. Write these ratios in simplest form.

   a. the number of nickels to the number of dimes

   b. the value in cents of the nickels to the value in cents of the dimes

   c. the value in cents of the nickels to the total value in cents

## Suggested Answers

1. a. The ratio of the number of tacks to the number of paper clips is 2 to 5.

   b. The ratio of the number of paper clips to the total number of objects is 5 to 7.

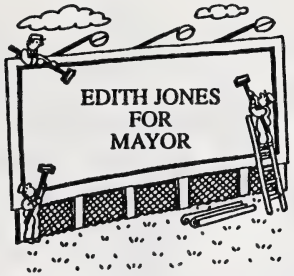
2. a. The ratio of the number of nickels to the number of dimes is 3 to 2.

   b. The ratio of the value in cents of the nickels to the value in cents of the dimes is 15 to 20, or 3 to 4.

   c. The ratio of the value in cents of the nickels to the total value in cents is 15 to 35, or 3 to 7.

3. Write three equivalent ratios for each of the following.

   a. 2 out of 3 people voted for Edith Jones.




   b. At the County Fair 20 student tickets were sold for every 5 adult tickets sold.

3. a. Answers will vary. These are a few possibilities.

   4 out of 6 people voted for Edith Jones.

   6 out of 9 people voted for Edith Jones.

   8 out of 12 people voted for Edith Jones.

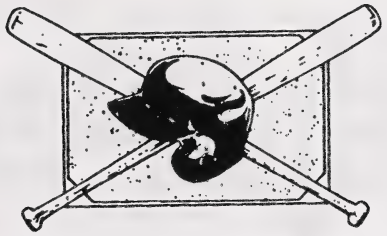
   b. Answers will vary. These are a few possibilities.

   4 student tickets were sold for every 1 adult ticket sold.

   40 student tickets were sold for every 10 adult tickets sold.

   60 student tickets were sold for every 15 adult tickets sold.

4. A baseball team won 36 out of 42 games during the season. It won 8 out of 11 games during the playoffs. Was the ratio of the number of games won to the number of games played better during the season or during the playoffs?



5. Matt sank 20 basketballs in 36 shots. Jon sank 10 basketballs in 18 shots. Are these ratios proportional?

4. During Season

$\frac{36}{42} = 0.\dot{8}57142\dot{}$

$\doteq 0.9$

Playoffs

$\frac{8}{11} = 0.\dot{7}\dot{2}$

$\doteq 0.7$

Since $0.9 > 0.7$, $\frac{36}{42} > \frac{8}{11}$.

5. Matt

$\frac{20}{36} = \frac{5}{9}$

Jon

$\frac{10}{18} = \frac{5}{9}$

Since $\frac{5}{9} = \frac{5}{9}$, $\frac{20}{36} = \frac{10}{18}$.

Yes, the two situations are proportional.

6. In Tara's class the ratio of the number of girls to the number of boys is 3 to 2. There are 18 girls in the class. How many boys are there in this class?

7. The ratio of the measure in mL of uncooked macaroni to the measure in mL of cooked macaroni is 1 to 3. How much cooked macaroni is made from 350 mL of uncooked macaroni?

6. $\frac{\text{girls}}{\text{boys}}$ $\quad \frac{3}{2} = \frac{18}{\square}$

$\frac{3}{2} \overset{\times 6}{=} \frac{18}{12}$ $\quad (\times 6)$

There are 12 boys in Tara's class.

7. $\frac{\text{uncooked}}{\text{cooked}}$ $\quad \frac{1}{3} = \frac{350}{\square}$

$\frac{1}{3} \overset{\times 350}{=} \frac{350}{1050}$ $\quad (\times 350)$

1050 mL of cooked macaroni is made when 350 mL of uncooked macaroni is used.

## Guiding the Student

After checking the answers, compare the student's results with the following chart. (The chart lists the skills covered in the Pretest and the section in which the skill will be taught.)

| Question | Skill | Section |
|---|---|---|
| 1 | Interpreting a ratio | 2 |
| 2 | Writing ratios in simplest form | 3 |
| 3 | Writing equivalent ratios | 3 |
| 4 | Comparing ratios | 4 |
| 5 | Comparing ratios | 4 |
| 6 | Finding a missing term in a proportion | 5 |
| 7 | Finding a missing term in a proportion | 5 |

Help the student to decide what to do next. It is recommended that the student does most of the sections which correspond to the questions with which the student experienced difficulties and only the concluding activities in sections which correspond to the questions with which the student experienced success. If the student had success with the Pretest, tell him or her to progress through Sections 2 to 6 very quickly.

# RATIOS

## What Lies Ahead

The student will learn these skills:

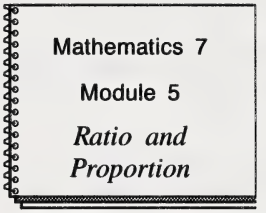
- interpreting a ratio
- writing a ratio using a colon
- writing a ratio using its fraction form
- writing a ratio using its decimal form
- reading a ratio

The student will learn these words:

- ratio
- term (of a ratio)
- first term of a ratio
- second term of a ratio

## Gathering Materials

In this section the student will need these items.



SRA Computer Drill & Instruction: Mathematics, Level D. "Ratios & Percents Lesson 1-5."

Pattern blocks

5 speed bicycle

## Guiding the Student

- Have the student turn to Section 2 in the Module Booklet and read the "What Lies Ahead" box.
- Next, have the student read "Working Together" and do the Introductory Activities.
- Afterwards help the student check the answers and correct any errors.

## Introductory Activities

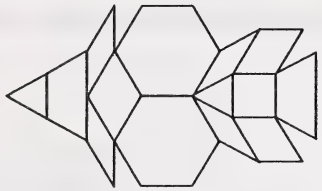
1. Use pattern blocks to make this design. Then write statements using these ratios.

   a. 3 to 1

   b. 4 to 3

   c. 1 to 4

   d. 3 to 14



2. Use the pattern in Question 1 and write as many statements as you can using 2 to 3.

## Suggested Answers

1. a. The ratio of the number of blue parallelograms to the number of orange squares is 3 to 1.

   b. The ratio of the number of brown parallelograms to blue parallelograms is 4 to 3.

   c. The ratio of orange squares to the number of brown parallelograms is 1 to 4.

   d. The ratio of the number of blue parallelograms to the total number of blocks is 3 to 14.

2. • The ratio of the number of yellow hexagons to the number of blue parallelograms is 2 to 3.

   • The ratio of the number of red trapezoids to the number of blue parallelograms is 2 to 3.

   • The ratio of the number of green triangles to the number of blue parallelograms is 2 to 3.

3. Write statements comparing the cost in dollars of the objects in the diagram. Use these ratios.

   a. 32 to 7

   b. 8 to 17

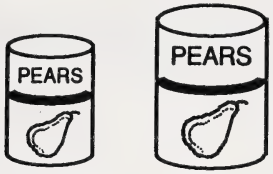
   c. 17 to 64

4. Write statements comparing the capacity of the cans in the diagram. Use these ratios.

   a. 400 to 300

   b. 300 to 700

   c. 400 to 700




3. a. The ratio of the cost of the mitt to the cost of the cap is 32 to 7.

   b. The ratio of the cost of the ball to the cost of the bat is 8 to 17.

   c. The ratio of the cost of the bat to the total cost is 17 to 64.

4. a. The ratio of the capacity of the larger can to the smaller can is 400 to 300.

   b. The ratio of the capacity of the smaller can to the total capacity of the cans is 300 to 700.

   c. The ratio of the capacity of the larger can to the total capacity of the cans is 400 to 700.

5. Write 3 statements using ratios comparing the value in cents of the coins in the diagram.

5. The ratio of the value in cents of the dime to the value in cents of the nickel is 10 to 5.

   The ratio of the value in cents of the nickel to the value in cents of the dime is 5 to 10.

   The ratio of the value in cents of the nickel to the total value in cents is 5 to 15.

   The ratio of the value in cents of the dime to the total value in cents is 10 to 15.

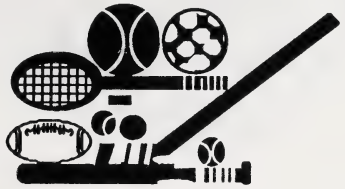
**Guiding the Student**

- Have the student read "Working Together" and do the Practice Activities.
- Afterwards help the student check the answers and correct any errors.

## Practice Activities

### Print Alternative

1. There are 6 balls in the group of 10 items of sports equipment. What is the ratio of the number of balls to the total number of equipment items? Use the fraction form.



2. There are 5 roses and 8 daisies. Write the ratio for each of the following. Use the fraction form for your answers.

   a. the number of roses to the number of daisies

   b. the number of roses to the total number of flowers

## Suggested Answers

1. The ratio of the number of balls to the total number of equipment items is $\frac{6}{10}$ , or $\frac{3}{5}$ .

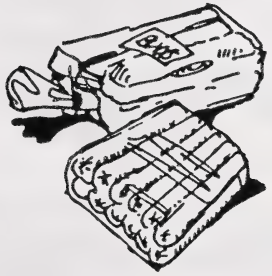
2. a. The ratio of the number of roses to the number of daisies is $\frac{5}{8}$ .

   b. The ratio of the number of roses to the total number of flowers is $\frac{5}{13}$ .

3. The Hawks hockey team won 41 games, lost 10 games and tied 29 games. Write the win-loss ratio. Use the colon form for the ratio.

3. The ratio of the number of games won by the Hawks to the number of games lost is 41 : 10.

4. There are 8 buns in a package. There are 12 weiners in a package. Write the ratio of the number of weiners to the number of buns. Use the colon form for the ratio.



4. The ratio of the number of wieners to the number of buns is 12 : 8, or 3 : 2.

## Computer Alternative

5. Do Lesson 1, 2, 3, 4, 5 of the disk "Ratio and Percent" from the package *Computer Drill and Instruction: Mathematics, Level D* (SRA).

   Read the instructions in the folder with the disk before using the program. Remember if you need help, press the SHIFT key and the [?] key.

5. Computer checked

### Guiding the Student

- Have the student read "Working Together" and do the Concluding Activities.
- Afterwards help check the answers and correct any errors.

## Concluding Activities

1. A five-speed bicycle has the gear ratios shown in the table at the right.

Complete the table by expressing the gear ratios in decimal number form rounded to the nearest thousandth.

b. How do you think the different gear ratios affect pedalling?

## Suggested Answers

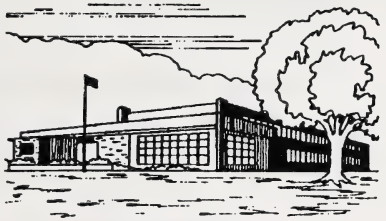
1. a.

| Teeth on Front Gear | Teeth on Back Gear | Gear Ratio |
|---|---|---|
| 40 | 28 | 1.429 |
| 40 | 24 | 1.667 |
| 40 | 20 | 2.000 |
| 40 | 17 | 2.353 |
| 40 | 14 | 2.857 |

b. The higher the gear ratio, the greater the effort required, but the faster the speed.

If possible have the student examine a 5-speed bicycle and test the gears to see how different gear ratios affect pedalling.

2. There are 128 students and 5 teachers in a school. Write the student-teacher ratio. Use the decimal number form for your answer.



2. The student-teacher ratio is 25.6.

# EQUIVALENT RATIOS

## What Lies Ahead

The student will learn these skills:

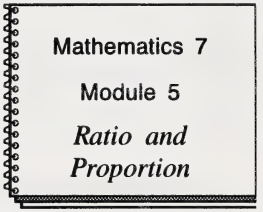
- finding equivalent ratios
- writing ratios in simplest form

These words will be learned:

- equivalent ratios
- lowest terms

## Gathering Materials

In this section the student will need these items.



MAC 8 Disk B Program A

SRA Computer Drill & Instruction: Mathematics, Level D. "Ratios & Percent Lesson 7."

## Guiding the Student

- Have the student turn to Section 3 in the Module Booklet and read the "What Lies Ahead" box.
- Next, have the student read "Working Together" and do the Introductory Activities.
- Afterwards help the student check the answers and correct any errors.

## Practice Activities

1. A piano class of 12 students has 4 boys. Use a diagram to show equivalent ratios of the number of boys to the number of students.

## Suggested Answers

1. There are 4 boys in 12 children.

$\frac{4}{12}$

There are 2 boys in 6 children.

$\frac{2}{6}$

There is 1 boy in 3 children.

$\frac{1}{3}$

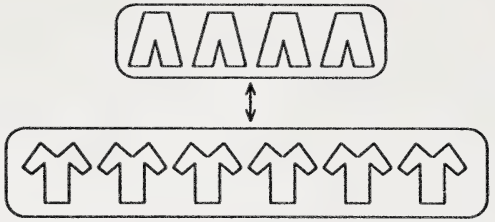
**Note**

Here part of a set is compared to the whole set.

2. Janice has 6 shirts and 4 pairs of slacks. Use a diagram to show equivalent ratios of the number of slacks to the number of shirts.

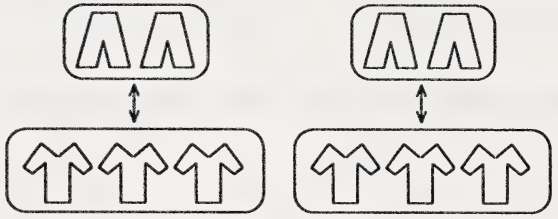
2. There are 4 slacks to 6 shirts.

$\frac{4}{6}$



There are 2 slacks to 3 shirts.

$\frac{2}{3}$



**Note:** Here two different sets are being compared.

**Guiding the Student**

- Have the student read "Working Together" and do the Practice Activities.
- Afterward help the student check the answers and correct any errors.

## Practice Activities

1. Use multiplication or division to write an equivalent ratio for each of the following.

   a. The ratio of the number of boxes to the number of bags is 3 to 5.

   b. The ratio of the number of triangles to the number of squares is 6 to 4.

## Suggested Answers

1. a. Answers will vary. These are a few possible answers.

$$\frac{3}{5} \overset{\times 2}{=} \frac{6}{10} \qquad \frac{3}{5} \overset{\times 3}{=} \frac{9}{15} \qquad \frac{3}{5} \overset{\times 4}{=} \frac{12}{20}$$

   b. Answers will vary. These are a few possible answers.

$$\frac{6}{4} \overset{+ 2}{=} \frac{3}{2} \qquad \frac{6}{4} \overset{\times 2}{=} \frac{12}{8} \qquad \frac{6}{4} \overset{\times 3}{=} \frac{18}{12}$$

2. Express each ratio given in lowest terms.

a. The ratio of the number of cars to the number of bicycles is 8 to 12.

2. a. $\frac{8}{12} \overset{\div 4}{=} \frac{2}{3}$

b. The ratio of the number of dogs to the number of cats is 5 to 10.

b. $\frac{5}{10} \overset{\div 5}{=} \frac{1}{2}$

c. The ratio of the number of pens to the number of pencils is 12 to 30.

c. $\frac{12}{30} \overset{\div 6}{=} \frac{2}{5}$

**Guiding the Student**

- Have the student do the Concluding Activities.
- Afterward help the student check the answers and correct any errors.

## Concluding Activities

1. Draw a set of 9 shapes for which the ratio of the number of circles to the number of triangles is 1 to 2.

2. Draw a set with more than 9 shapes for which the ratio of the number of circles to the number of triangles is 1 : 2.

## Suggested Answers

1.

$\frac{3}{6} = \frac{1}{2}$

There are 9 shapes altogether.

2. Answers will vary. These are a few possibilities.

$\frac{4}{8} = \frac{1}{2}$

There are 12 shapes altogether.

$\frac{5}{10} = \frac{1}{2}$

There are 15 shapes altogether.

$\frac{6}{12} = \frac{1}{2}$

There are 18 shapes altogether.

3. Draw a set with more than 3, but less than 9 shapes, for which the ratio of the number of circles to the number of triangles is $\frac{1}{2}$ .

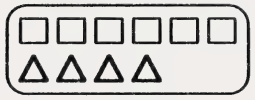
4. A set of shapes contains 6 squares and some triangles. The ratio of the number of triangles to the number of squares is 2 to 3. Draw the set of shapes.

3.

$$\frac{2}{4} \overset{\div 2}{=} \frac{1}{2}$$

There are 6 shapes altogether.

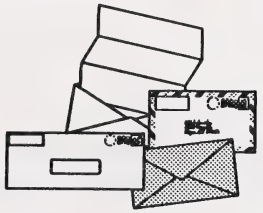
4.



$$\frac{4}{6} \overset{\div 2}{=} \frac{2}{3}$$

There are 6 squares and 4 triangles.

5. Jane has 40 stamps. The ratio of the number of Canadian stamps to the number of foreign stamps is 3 to 1. How many stamps of each type does she have?



6. Write the ratio in simplest form for each of these situations.

   a. the number of dimes in a dollar to the number of quarters in a dollar

   b. the number of dimes in three dollars to the number of quarters in three dollars

5. Use guess-check-revise method.

| C | C | C | C | C | F | F | F |
|---|---|---|---|---|---|---|---|
| C | C | C | C | C | F | F | F |
| C | C | C | C | C | F | F | F |
| C | C | C | C | C | F | F | F |
| C | C | C | C | C | F | F | F |

$$\frac{30}{10} \overset{\div 10}{=} \frac{3}{1}$$

Jane has 30 Canadian stamps and 10 foreign stamps.

6. a.

$$\frac{10}{4} \overset{\div 2}{=} \frac{5}{2}$$

b.

$$\frac{30}{12} \overset{\div 6}{=} \frac{5}{2}$$

c. the value in cents of a dime to the value in cents of a quarter

c. $\frac{10}{25} = \frac{2}{5}$ (÷ 5 above and ÷ 5 below)

d. the value in cents of a dime to the value in cents of a dollar

d. $\frac{25}{100} = \frac{1}{4}$ (÷ 25 above and ÷ 25 below)

**Computer Alternative**

7. If you have access to a computer, do Program 9A of Disk B of MAC 8 (Ratio Rendezvous). Read the instructions in the folder with the disk before using the program.

7. Computer checked

# COMPARING AND ORDERING RATIOS

## What Lies Ahead

The student will learn these skills:

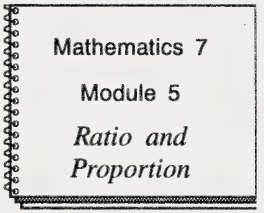
- comparing ratios
- ordering ratios from largest to smallest or from smallest to largest
- determining if situations are proportional

These words will be learned:

- golden ratio
- gear ratio
- proportion
- proportional ratio
- proportional

## Gathering Materials

In this section the student will need these items.



SRA Computer Drill & Instruction:
Mathematics, Level D. " Percent" Lesson 7.

## Guiding the Student

- Have the student turn to Section 4 in Module Booklet and read "What Lies Ahead" box.
- Next have student read "Working Together" and do the Introductory Activities.
- Afterwards help the student to check the answer and correct any errors.

## Introductory Activities

1. Last year a bowling team won 90 out of 162 games. So far this year they have won 10 out of 12 games. Is the team doing better or worse this year than it did last year?

## Suggested Answers

1. Express the ratios in their decimal number forms.

   Last year: $\frac{90}{162} = 0.5555\ldots$, or $\frac{90}{162} \doteq 0.56$

   This year: $\frac{10}{12} = 0.83333\ldots$, or $\frac{10}{12} \doteq 0.83$

   Compare the decimal numbers.

   $0.56 > 0.83$

   So $\frac{10}{12} > \frac{90}{162}$.

   The team is doing better this year as compared to last year.

2. In three games a basketball player made 7 of 10, 9 of 20 and 3 of 5 shots.

a. In which game did the player have the greatest success?

b. In which game did the player have the least success?

2. Express the ratios in their decimal number forms.

Game 1: $\frac{7}{10} = 0.7$
Game 2: $\frac{9}{20} = 0.45$
Game 3: $\frac{3}{5} = 0.6$

Compare the decimal numbers.

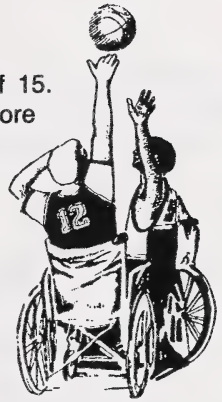
$0.7 > 0.6 > 0.45$

So $\frac{7}{10} > \frac{3}{5} > \frac{9}{20}$.

a. The player had the best success when he made 7 out of 10 shots.

b. The player had least success when he made 9 out of 20 shots.

3. Matt and Jon play wheelchair basketball. Matt sank 6 out of 9 basketball shots. Jon sank 9 out of 15. Which of these two players is a more accurate shooter?



4. Kara scored 17 out of 25 on the first test and 14 out of 20 on the second test. On which test did she do better?

3. Express the ratios in their decimal number forms.

Matt: $\frac{6}{9} = 0.6666\ldots$, or $\frac{6}{9} = 0.7$

Jon: $\frac{9}{15} = 0.6$

Compare the decimal numbers.

$0.7 > 0.6$

So $\frac{6}{9} > \frac{9}{15}$

Matt is a more accurate shooter.

4. Express the ratios in their decimal number forms.

First test: $\frac{17}{25} = 0.68$

Second test: $\frac{14}{20} = 0.7$

Compare the decimal numbers.

$0.7 > 0.68$

So 14 out of 20 > 17 out of 25.

Kara did better on the second test.

5. One solution contains 350 mL of water and 450 mL of antifreeze. Another solution contains 800 mL of water and 900 mL of antifreeze. Which solution has the lower ratio of antifreeze to water?

5. Express each ratio in decimal number form.

Solution 1: $\frac{450}{350} = 1.125$

Solution 2: $\frac{900}{800} = 1.286$

Compare the decimal numbers.

$1.125 < 1.286$

So $\frac{900}{800} < \frac{450}{350}$.

The solution with the lower ratio of antifreeze to water is the one which contains 800 mL of water and 900 mL of antifreeze.

6. Yuriko spelled 35 out of 40 words correctly. Derek spelled 49 out of 56 words correctly. Who is the better speller?

6. Express each ratio in decimal number form.

Yuriko: $\frac{35}{40} = \frac{7}{8}$

Derek: $\frac{49}{56} = \frac{7}{8}$

Compare the decimal numbers.

$\frac{7}{8} = \frac{7}{8}$

So $\frac{35}{40} = \frac{49}{56}$.

They are equally good spellers.

**Computer Alternative**

7. If you want further practice, do Lesson 7 of the "Ratio and Percent" disk from the Package *SRA Computer Drill and Instruction: Mathematics, Level D* (SRA). Read the instructions in the folder with the disk before using the program.

   Remember if you need help, press the SHIFT key and the  key.

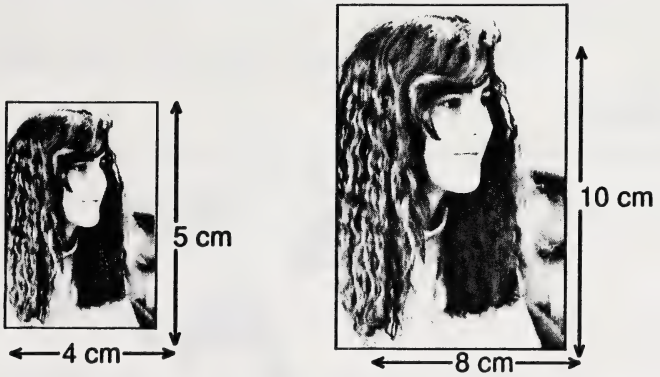
7. computer checked

**Guiding the Student**

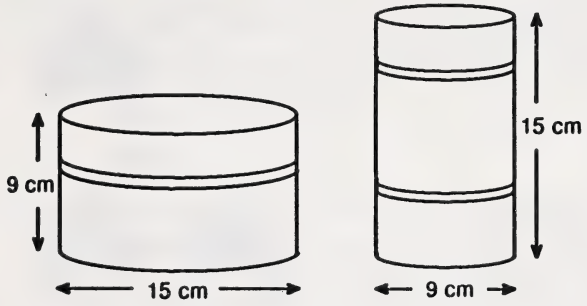
- Have the student read "Working Together" and do the Practice Activities.
- Afterward help the student check the answers and correct any errors.

## Practice Activities

1. Are the sizes of the photographs proportional? Why?




2. Are the sizes of the two cans proportional? Explain.




## Suggested Answers

1. $\{40\}\ \frac{10}{8} \times \frac{5}{4}\ \{40\}$

The cross products are equal.

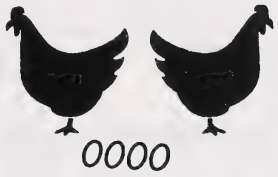
So, yes, the photographs are proportional.

2. $\{81\}\ \frac{9}{15} \times \frac{15}{9}\ \{225\}$

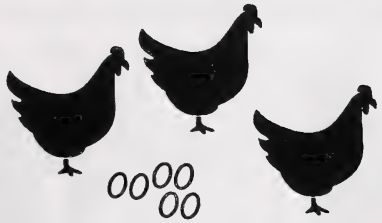
The cross products are not equal.

So, no, the cans are not proportional.

3. What are the ratio of the number of hens to the number of eggs in these pictures? Are the ratios proportional? Why or why not?

a. 

b.

c. 

a. $\frac{2}{4}$

b. $\frac{1}{2}$

c. $\frac{3}{6}$

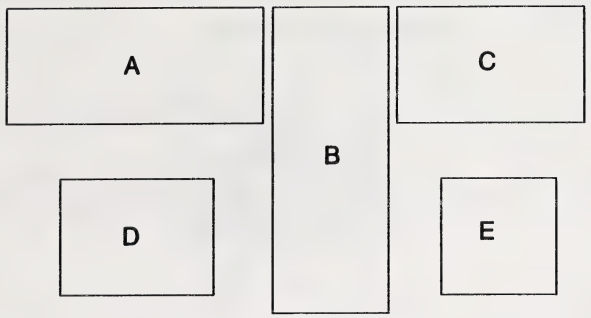
The ratios are proportional because in each there are half as many hens as eggs.

**Guiding the Student**

- Have the student do the Concluding Activities.
- Afterward help the student check the answers and correct any errors.

## Concluding Activities

1. Consider the following rectangles.




   a. Which of these appeals most to your eye?

   b. For each rectangle, measure its length and width. Use your calculator to find the ratio of its length to its width. Give each ratio in its decimal number form rounded to the nearest tenth.

   c. The ancient Greeks felt that the rectangles that were most appealing to the eye were those in which the ratio of the length to width was 1.618. They called this the **golden ratio**. They used rectangles with this ratio in many of their buildings.

      Are any of the ratios in Part b of this question close to the golden ratio? If so, which one?

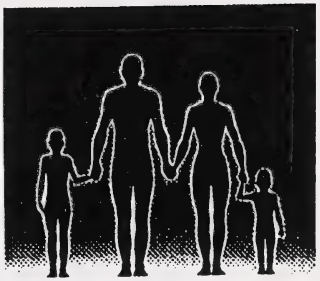
## Suggested Answers

1. a. Answers will vary. The Greeks would say C.

   b. The ratio of longest side to shortest side
   for A is 2.2,
   for B is 2.6,
   for C is 1.6,
   for D is 1.3,
   for E is 1.0.

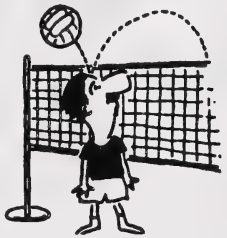
   c. The ratio for C is close to the golden ratio of 1.618.

2. a. Artists know that the body has certain proportions and use these proportions in their work. Recruit 3 friends and measure the heights of their heads and the heights of their bodies. Then use these measurements to find the ratio of the height of the body to the height of the head.



b. What do you notice about the ratios in Part a?

c. Examine the cartoon character below. What do you notice?



2. a.

| | Person #1 | Person #2 | Person #3 |
|---|---|---|---|
| height of body | | | |
| height of head | | | |
| ratio of height of body to height of head | | | |

Answers will vary, but all the ratios when expressed in decimal form should be about 7.

b. The ratios are proportional.

c. The ratio of the body to the head in the cartoon character is much smaller than normal. The drawing is out of proportion.

# FINDING A MISSING TERM IN A PROPORTION

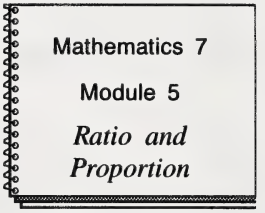
## What Lies Ahead

The student will learn these skills:

- writing a proportion
- finding the missing term of a proportion

## Gathering Materials

In this section the student will need these items.



SRA Computer Drill & Instruction: Mathematics, Level D. " Ratio & Percent" Lesson 8.

## Guiding the Student

- Have the student turn to Section 5 in Module Booklet and read the "What Lies Ahead" box.
- Next have student read "Working Together" and do the Practice Activities.
- Afterwards help the student to check the answer and correct any errors.

## Practice Activities

1. In a restaurant, the ratio of the number of staff to the number of customers is 3 : 13. There are nine staff people. How many customers are there?

2. Maria's mass and Jean's mass are in the ratio of 5 : 4. Maria's mass is 45 kg. What is Jean's mass?

## Suggested Answers

1. $\frac{\text{Staff}}{\text{Customers}}$

$$\frac{3}{13} = \frac{9}{\square}$$

$$\frac{3}{13} \overset{\times 3}{=} \frac{9}{\boxed{39}}$$

There are 39 customers.

2. $\frac{\text{Maria}}{\text{Jean}}$

$$\frac{5}{4} = \frac{45}{\square}$$

$$\frac{5}{4} \overset{\times 9}{=} \frac{45}{\boxed{36}}$$

Jean's mass is 36 kg.

3. The ratio of canoes to sailboats on Thunder Lake is 7 to 2. There are 21 canoes. How many sailboats are there?

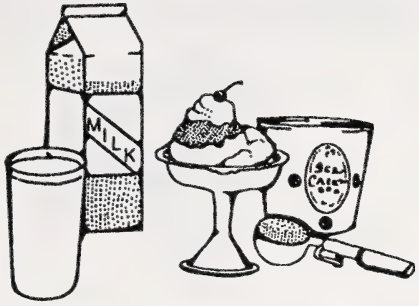
3. $\frac{\text{canoes}}{\text{sailboats}}$

$$\frac{7}{2} = \frac{21}{\square}$$

$$\frac{7}{2} \overset{\times 3}{=} \frac{21}{\boxed{6}}$$

There are 6 sailboats on Thunder Lake.

4. The ratio of ice cream to milk in a milkshake is 1 to 3. If Krish uses 250 mL of ice cream, how much milk should he use?




4. $\frac{\text{ice cream}}{\text{milk}}$

$$\frac{1}{3} = \frac{250}{\square}$$

$$\frac{1}{3} = \frac{250}{\boxed{750}}$$

Krish should use 750 mL of milk when making a milkshake.

5. The ratio of uncooked rice to cooked rice is 1 to 5. How much uncooked rice is needed to make 250 mL of cooked rice?

6. Frozen orange juice concentrate is mixed with water in the ratio of 1 : 3. How much water is needed if you use 300 mL of concentrate?

5. $\frac{\text{uncooked}}{\text{cooked}}$

$$\frac{1}{5} = \frac{\square}{250}$$

$$\frac{1}{5} \overset{\times 50}{=} \frac{\boxed{50}}{250}$$

The amount of uncooked rice needed is 50 mL.

6. $\frac{\text{concentrate}}{\text{water}}$

$$\frac{1}{3} = \frac{300}{\square}$$

$$\frac{1}{3} \overset{\times 300}{=} \frac{300}{\boxed{900}}$$

The amount of water needed is 900 mL.

## Guiding the Student

- If the student had difficulty with the Practice Activities, assign the Extra Practice. If the student had success with the Practice Activities, assign the Concluding Activities.
- Afterwards help the student check the answers and correct any errors.

## Extra Practice

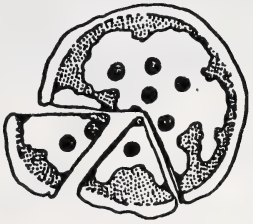
### Computer Alternative

1. Do Lesson 8 of the "Ratio and Percent" disk from the Package *SRA Computer Drill and Instruction: Mathematics, Level D.* Read the instructions in the folder with the disk before using the program.

   Remember if you need help, press the SHIFT key and the [?] key.

### Print Alternative

2. If 2 large pizzas serve 5 people, how many large pizzas are needed to serve 20 people?



## Suggested Answers

1. Computer checked.

2. *pizzas* / *people*

$$\frac{2}{5} = \frac{\square}{20}$$

$$\frac{2}{5} \overset{\times 4}{=} \frac{\boxed{8}}{20}$$

8 large pizzas are needed to serve 20 people.

3. To make a certain shade of orange, 3 parts of yellow are mixed with 4 parts of red. An artist is going to use 60 mL of yellow paint to make this shade of orange. How much red paint is needed?

4. For every 3 loaves of bread a food bank gives away, it gives away 10 oranges. In one day 57 loaves of bread were given away. How many oranges were given away on the same day?

3. $\frac{\text{yellow}}{\text{red}}$

$$\frac{3}{4} = \frac{60}{\square}$$

$$\frac{3}{4} \overset{\times 20}{=} \frac{60}{\boxed{80}}$$

80 mL of red paint is needed to make this shade of orange.

4. $\frac{\text{bread}}{\text{oranges}}$

$$\frac{3}{10} = \frac{57}{\square}$$

$$\frac{3}{10} \overset{\times 19}{=} \frac{57}{\boxed{190}}$$

190 oranges were given away on the day when 57 loaves of bread were sold.

5. A cookie recipe calls for 2 parts of flour to 1 part of sugar. Tom uses 350 mL of flour. How much sugar does Tom need to make these cookies?

5. $\frac{\text{flour}}{\text{sugar}}$

$$\frac{2}{1} = \frac{350}{\square}$$

$$\frac{2}{1} \overset{\times 175}{=} \frac{350}{175} \quad (\times 175)$$

Tom needs 175mL of sugar when he uses 350 mL of flour to make these cookies.

**Guiding the Student**

- Have the student do the Concluding Activities.
- Afterwards help check the answers and correct any errors.

## Concluding Activities

1. a. In spite of their small size, ants can lift surprisingly heavy objects. Some ants can lift objects that are 50 times heavier than their bodies. What is the ratio of the mass of an ant to the mass it can lift?

   b. How much mass can a 0.25-g ant lift?

## Suggested Answers

1. a. The ratio of the mass of an an to the mass it can lift is 1 : 50.

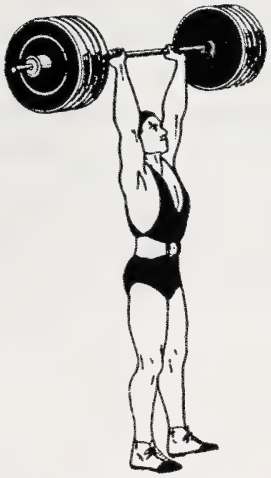
   b. $\frac{\text{mass of ant}}{\text{mass it can lift}}$

$$\frac{1}{50} = \frac{0.25}{\square}$$

$$\frac{1}{50} \overset{\times 0.25}{=} \frac{0.25}{12.5} \quad (\times 0.25)$$

A 0.25-g ant can lift 12.5 g.

2. a. If your strength was proportional to an ant's, how much mass could you lift?



b. How much can you really lift?

c. What is the ratio of your mass to the mass you can lift?

2. a. Answers will vary.

Be sure the student measures his/her mass or weight and the object lifted in the same unit.

Suppose your mass is 42 kg.

$$\frac{0.25}{12.5} = \frac{42}{\square}$$

$$\frac{0.25}{12.5} \overset{\times 168}{=} \frac{42}{2100}$$

If your strength was proportional to an ant's, you could lift 2100 kg.

b. Answers will vary. You could probably lift 20 kg, but certainly not 2100 kg.

c. Answers will vary. If you could lift 20 kg and your mass is 42 kg, this would give a ratio of $\frac{42}{20}$ or $\frac{21}{10}$ or 2.1.

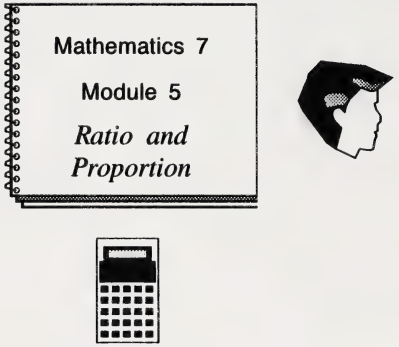
# SUMMARY

## What Lies Ahead

In this summary the student will review the skills taught in Sections 1 to 5.

## Gathering Materials

The student will need these items.




## Guiding the Student

- Have the student turn to the Summary in the Module Booklet and review the skills taught in Sections 1 to 5.
- Then have the student correct any errors in the Pretest.

# GETTING SET

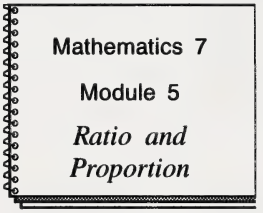
## What Lies Ahead

These skills will be tested:

- expressing a ratio, out of 100, as a percent
- expressing a ratio, not out of 100, as a percent
- expressing a percent as a decimal and a fraction
- expressing a decimal and a fraction as a percent
- finding a percent of a number

## Gathering Materials

In this section the student will need these items.



## Guiding the Student

- Have the student turn to Section 7 in Module Booklet and read the "What Lies Ahead" box and "Working Together."
- Next have student do the Pretest. The Pretest will help you decide what the student should do next.
- Afterwards help the student to check the answers. It may not be necessary to correct errors. See the last page of this section for further instructions.

## Pretest

1. In a package of 100 gummed stars there are 28 blue, 13 gold, 23 green and 15 silver stars. The rest are red. Express the number of stars of each color as a percent of the total.

2. Express each ratio below as a percent.

   a. $\frac{27}{100}$

   b. 20 : 100

   c. 12 out of 20

   d. $\frac{15}{25}$

   e. 6 : 10

## Suggested Answers

1. $\frac{28}{100} = 28\%$; $\frac{13}{100} = 13\%$;

   $\frac{23}{100} = 23\%$; $\frac{15}{100} = 15\%$;

   $\frac{21}{100} = 21\%$

   Of all the stars, 28% are blue, 13% are gold, 23% are green, 15% are silver and 21% are red.

2. a. 27%

   b. 20%

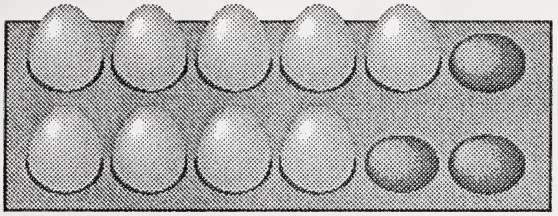
   c. $\frac{12}{20} = \frac{60}{100} = 60\%$

   d. $\frac{15}{25} = \frac{60}{100} = 60\%$

   e. $\frac{6}{10} = \frac{60}{100} = 60\%$

3. a. What percent of the egg carton below is full?

   b. What percent of the egg carton below is empty?



4. Rewrite each of these sentences using a percent.

   a. The team won 0.85 of its games.

   b. During a sale the price was reduced by $\frac{1}{2}$.

   c. Maria scored 18 out of 25 on a test.

3. a. $\frac{9}{12} = \frac{3}{4} = \frac{75}{100} = 75\%$

   75% of the carton is full

   b. $100\% - 75\% = 25\%$

   25% of the carton is empty.

4. a. $0.85 = \frac{85}{100} = 85\%$

   The team won 85% of its games.

   b. $\frac{1}{2} = \frac{50}{100} = 50\%$

   During a sale the price was reduced by 50%.

   c. $\frac{18}{25} = \frac{72}{100} = 72\%$

   Marie scored 72% on a test.

5. Express each decimal number as a percent.

   a. 0.35

   b. 0.07

   c. 0.4

   d. 0.62

6. Express each fraction given as a percent.

   a. $\frac{23}{100}$

   b. $\frac{3}{10}$

   c. $\frac{4}{5}$

   d. $\frac{8}{200}$

   e. $\frac{7}{25}$

5. a. $0.35 = \frac{35}{100} = 35\%$

   b. $0.07 = \frac{7}{100} = 7\%$

   c. $0.4 = \frac{4}{10} = \frac{40}{100} = 40\%$

   d. $0.62 = \frac{62}{100} = 62\%$

6. a. $\frac{23}{100} = 23\%$

   b. $\frac{3}{10} = \frac{30}{100} = 30\%$

   c. $\frac{4}{5} = \frac{80}{100} = 80\%$

   d. $\frac{8}{200} = \frac{4}{100} = 4\%$

   e. $\frac{7}{25} = \frac{28}{100} = 28\%$

7. Express each percent given as a decimal number and as a fraction in lowest terms.

   a. 45%

   b. 9%

   c. 20%

   d. 16%

7. a. $45\% = 0.45$ $45\% = \frac{45}{100} = \frac{9}{20}$

   b. $9\% = 0.09$ $9\% = \frac{9}{100}$

   c. $20\% = 0.2$ $20\% = \frac{20}{100} = \frac{1}{5}$

   d. $16\% = 0.16$ $16\% = \frac{16}{100} = \frac{4}{25}$

8. Estimate the answer for each of the following.

   a. 40% of 102

   b. 22% of 10

   c. 66% of 300

8. Answers will vary. Students may use rounding or front-end digits. Students may also compensate.

   a. about 40

   b. about 2

   c. about 20

9. Calculate the answer for each of the following.

   a. 48% of 2000

   b. 22% of 10

   c. 66% of 300

10. About 20% of Canada's population is under the age of 15. In 1986 the population was about 25 000 000.

    a. About how many people in Canada were under 15?

    b. About how many people in Canada were over 15?

9. a. 4% of 2000 = 0.48 × 2000 = 960

   b. 22% of 10 = 0.022 × 10 = 2.2

   c. 66% of 300 = 0.66 × 300 = 198

10. a. 20% of 25 000 000 = 0.2 × 25 000 000 = 5 000 000

    In 1986 about 5 000 000 people were under 14.

    b. 80% of 25 000 000 = 0.8 × 25 000 000 = 20 000 000

    or 25 000 000 − 5 000 000 = 20 000 000

    In 1986 about 20 000 000 people were over 15.

## Guiding the Student

After checking the answers, compare the student's results with the following chart. (The chart lists the skills covered in the Pretest and the section in which the skill will be taught.)

| Question | Skill | Section |
|---|---|---|
| 1,2a,b | expressing a ratio, out of 100, as a percent | 7 |
| 2c,d,e, 3 | expressing a ratio, not out of 100, as a percent | 7 |
| 4,5,6 | expressing fractions and decimals as a percent | 8 |
| 7 | expressing a percent as a fraction and a decimal | 8 |
| 8-10 | finding a percent of a number | 9 |

Help the student to decide what to do next. It is recommended that the student does most of the sections which correspond to the questions with which the student experienced difficulties and only the concluding activities in sections which correspond to the questions with which the student experienced success. If the student had success with the Pretest, tell him or her to progress through Sections 7 to 9 very quickly.

# PERCENTS

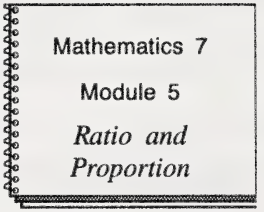
## What Lies Ahead

The student will learn these skills.

- interpreting percent
- expressing a ratio as a percent

## Gathering Materials

In this section the student will need these items.



SRA Computer Drill & Instruction: Mathematics, Level D, " Ratio & Percent" Lesson 9.

## Guiding the Student

- Have the student turn to Section 8 in Module Booklet and read "What Lies Ahead" box.
- Next have student read "Working Together" and do the Introductory Activities.
- Afterwards help the student to check the answer and correct any errors.

## Introductory Activities

1. On a mathematics test George answered 72 out of 100 questions correctly. Express this as a percent. Write a statement.

2. The ratio of men to women at a banquet was 94 to 100. Express this as a percent. Write a statement.

## Suggested Answers

1. George answers 72% of the questions on a mathematics test correctly.

2. The number of men at the banquet was 94% of the number of women attending this function.

3. What percent of the floor room is each of the following?

   a. guidance office

   b. main office

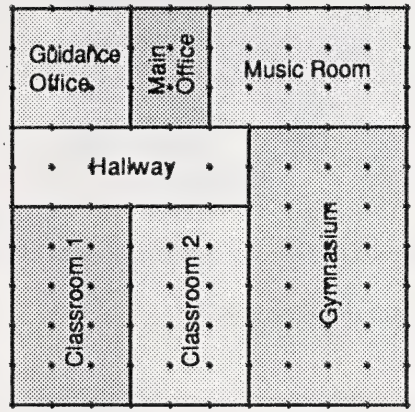
   c. music room

   d. gymnasium

   e. hallway

   f. classroom 1

   g. classroom 2




3. The entire floor space is 100 squares or 100%.

   a. The guidance office is 9 squares out of 100 or 9%.

   b. The main office is 6 squares out of 100 or 6%.

   c. The music room is 15 squares out of 100 or 15%.

   d. The gymnasium is 28 squares out of 100 or 28%.

   e. The hallway is 12 squares out of 100 or 12%.

   f. Classroom 1 is 15 squares out of 100 or 15%.

   g. Classroom 2 is 15 squares out of 100 or 15%.

4. What do all the percents in Question 3 total?

5. Raju was ill 3 days in every 100 days and was absent from school.

   a. What percent of the time was he ill?

   b. What percent of the time was he able to attend classes?

4. All the percents in Question 3 total 100%.

5. a. Raju was ill 3% of the time.

   b. Raju attended classes 97% of the time.

**Guiding the Student**

- Have the student read "Working Together" and do the Practice Activities.
- Afterwards help the student check the answers and correct any errors.

## Practice Activities

1. If 2 out of 25 bulbs tested by the Bright Light Company fails, what percent of the bulbs failed?

2. There are 17 boys to 20 girls on the bus. Express this ratio as a percent. Use a statement.

## Suggested Answers

1. $\frac{2}{25} \overset{\times 4}{=} \frac{8}{100}$

$= 8\%$

8% of the bulbs tested failed.

2. $\frac{17}{20} \overset{\times 5}{=} \frac{85}{100}$

$= 85\%$

The number of boys is 85% of the number of girls.

3. Janice received these marks on five tests.

| | |
|---|---|
| Language Arts | 19 out of 25 |
| Mathematics | 42 out of 50 |
| Science | 9 out of 10 |
| Social Studies | 16 out of 20 |
| French | 82 out of 100 |

a. Express each mark to a percent

b. Rank the test results from the highest percent to the lowest percent.

3. a. Language Arts $\frac{19}{25} = \frac{76}{100} = 76\%$

Mathematics $\frac{42}{50} = \frac{84}{100} = 84\%$

Science $\frac{9}{10} = \frac{90}{100} = 90\%$

Social Studies $\frac{16}{20} = \frac{80}{100} = 80\%$

French $\frac{82}{100} = 82\%$

b. The marks ranking from the highest mark to the lowest mark are the following:
90%, 84%, 82%, 80%, 76%

**Guiding the Student**

- Have the student do the Concluding Activities.
- Afterwards help the student check the answers.

## Concluding Activities

The student council had 2 candidates for president. Suzanne got 3 votes for every 2 votes that Ruth got. What percent of all the votes did Suzanne get?

## Suggested Answers

$3 + 2 = 5$

Out of every 5 votes, Suzanne got 3 votes.

$\frac{3}{5} = \frac{60}{100} = 60\%$

Suzanne got 60% of all the votes.

# FRACTIONS, DECIMALS AND PERCENTS

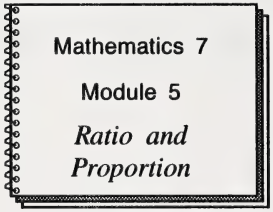
## What Lies Ahead

The student will learn these skills.

- expressing a percent as a decimal number
- expressing a percent as a fraction
- expressing a fraction as a percent
- expressing a decimal number as a percent

## Gathering Materials

In this section the student will need these items.



SRA Computer Drill & Instruction: Mathematics, Level D, "Ratio & Percent" Lessons 12, 13, 14, 15, 16, 20, 21.

## Guiding the Student

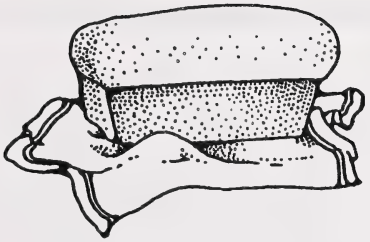
- Have the student turn to Section 9 in Module Booklet and read "What Lies Ahead" box.
- Next have student read "Working Together" and do the Practice Activities.
- Afterwards help the student to check the answer and correct any errors.

## Practice Activities

1. A loaf of bread is 60% whole wheat. Express the percent of whole wheat flour in this loaf of bread as these.

   a. a fraction in lowest terms

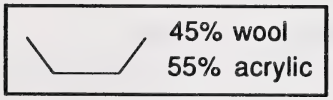
   b. a decimal number



2. The label on a sweater tells that it is made of wool fibre and acrylic fibre. Express each part as these.

   a. a fraction in lowest terms

   b. a decimal number




## Suggested Answers

1. a. $60\% = \frac{60}{100} = \frac{3}{5}$

   b. $60\% = \frac{60}{100} = 0.6$

2. a. $45\% = \frac{45}{100} = \frac{9}{20}$ $\quad 55\% = \frac{55}{100} = \frac{11}{20}$

   b. $45\% = \frac{45}{100} = 0.45$ $\quad 55\% = \frac{55}{100} = 0.55$

3. Coffee cream is 18% milk fat. Express the percent of milk fat as these.

   a. a fraction in lowest terms

   b. a decimal number

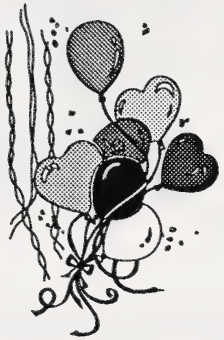
3. a. $18\% = \frac{18}{100} = \frac{9}{50}$

   b. $18\% = \frac{18}{100} = 0.18$

4. In a package, the number of red balloons is 40% of the number of yellow balloons. Express the percent as these.

   a. a fraction in lowest terms

   b. a decimal number



4. a. $40\% = \frac{40}{100} = \frac{2}{5}$

   b. $40\% = \frac{40}{100} = 0.40 = 0.4$

5. A solder is made of zinc, tin and lead. The amount of tin is 60% the amount of lead. Express the percent as these.

   a. a fraction in lowest terms

   b. a decimal number

5. a. $60\% = \frac{60}{100} = \frac{3}{5}$

   b. $60\% = \frac{60}{100} = 0.6$

6. About $\frac{3}{4}$ of the computer class were present. Express the fraction as these.

   a. a percent

   b. a decimal number

6. a. $\frac{3}{4} = \frac{75}{100} = 75\%$

   b. $\frac{3}{4} = \frac{75}{100} = 0.75$

7. The baseball batter hit safely in 0.25 of the times he was up to bat. Express the decimal number as these.

   a. a percent

   b. a fraction

7. a. $0.25 = \frac{25}{100} = 25\%$

   b. $0.25 = \frac{25}{100} = \frac{1}{4}$

8. The amount of fence Bruce painted is $\frac{1}{5}$ the amount Joan painted. Express the fraction as these.

   a. a percent

   b. a decimal

8. a. $\frac{1}{5} = \frac{20}{100} = 20\%$

   b. $\frac{1}{5} = \frac{2}{10} = 0.2$

9. Jake's age is 0.3 of his father's age. Express the decimal as these.

   a. a percent

   b. a fraction

9. a. $0.3 = \frac{3}{10} = \frac{30}{100} = 30\%$

   b. $0.3 = \frac{3}{10}$

10. Complete this table. Give the fractions in lowest terms.

10.

| | Fraction | Decimal | Percent |
|---|---|---|---|
| a. | $\frac{1}{100}$ | 0.01 | 1% |
| b. | $\frac{2}{100} = \frac{1}{50}$ | 0.02 | 2% |
| c. | $\frac{1}{10}$ | 0.01 | 10% |
| d. | $\frac{35}{100} = \frac{1}{20}$ | 0.35 | 35% |
| e. | $\frac{2}{10} = \frac{1}{5}$ | 0.2 | 20% |
| f. | $\frac{4}{10} = \frac{2}{5}$ | 0.4 | 40% |
| g. | $\frac{1}{2}$ | 0.05 | 50% |
| h. | $\frac{3}{5}$ | 0.6 | 60% |

## Guiding the Student

- If the student had difficulties with Practice Activities, assign the Extra Practice.
- If the student had success assign the Concluding Activities.
- Afterwards help the student check the answers and correct any errors.

## Extra Practice

### Computer Alternative

1. Do Lessons 11, 12, 13, 14, 15, 16, 20 and 21 of the "Ratio and Percent" disk from the package *Computer Drill and Instruction: Mathematics, Level D.* Read the instructions in the folder with the disk before using the program.

   Remember if you need help, press the SHIFT key and the [?] key.

### Print Alternative

2. Express each percent as a decimal number.

   a. 67%

   b. 68%

   c. 69%

   d. 70%

## Suggested Answers

1. computer checked

2. a. $67\% = \frac{67}{100} = 0.67$

   b. $68\% = \frac{68}{100} = 0.68$

   c. $69\% = \frac{69}{100} = 0.69$

   d. $70\% = 0.70 = 0.7$

3. Express each percent as a fraction in lowest terms.

   a. 20%

   b. 21%

   c. 22%

   d. 23%

4. Express each of these fractions as a percent and as a decimal number.

   a. $\frac{1}{10}$

   b $\frac{4}{5}$

   c. $\frac{3}{4}$

   d. $\frac{1}{2}$

3. a. $20\% = \frac{20}{100} = \frac{1}{5}$

   b. $21\% = \frac{21}{100}$

   c. $22\% = \frac{22}{100} = \frac{11}{50}$

   d. $23\% = \frac{23}{100}$

4.

| | Percent | Decimal Number |
|---|---|---|
| a. | $\frac{1}{10} = \frac{10}{100} = 10\%$ | $\frac{1}{10} = 0.1$ |
| b. | $\frac{4}{5} = \frac{80}{100} = 80\%$ | $\frac{4}{5} = \frac{8}{10} = 0.8$ |
| c. | $\frac{3}{4} = \frac{75}{100} = 75\%$ | $\frac{3}{4} = \frac{75}{100} = 0.75$ |
| d. | $\frac{1}{2} = \frac{50}{100} = 50\%$ | $\frac{1}{2} = \frac{5}{10} = 0.5$ |

5. Express each of these decimal numbers as a percent and as a fraction in lowest terms.

   a. 0.2

   b. 0.8

   c. 0.85

   d. 0.95

5.

| | Percent | Decimal Number |
|---|---|---|
| a. | $0.2 = \frac{2}{10} = \frac{20}{100} = 20\%$ | $0.2 = \frac{2}{10} = \frac{1}{5}$ |
| b. | $0.8 = \frac{8}{10} = \frac{80}{100} = 80\%$ | $0.8 = \frac{8}{10} = \frac{4}{5}$ |
| c. | $0.85 = \frac{85}{100} = 85\%$ | $0.85\ \frac{85}{100} = \frac{17}{20}$ |
| d. | $0.95 = \frac{95}{100} = 95\%$ | $0.95\ \frac{95}{100} = \frac{19}{20}$ |

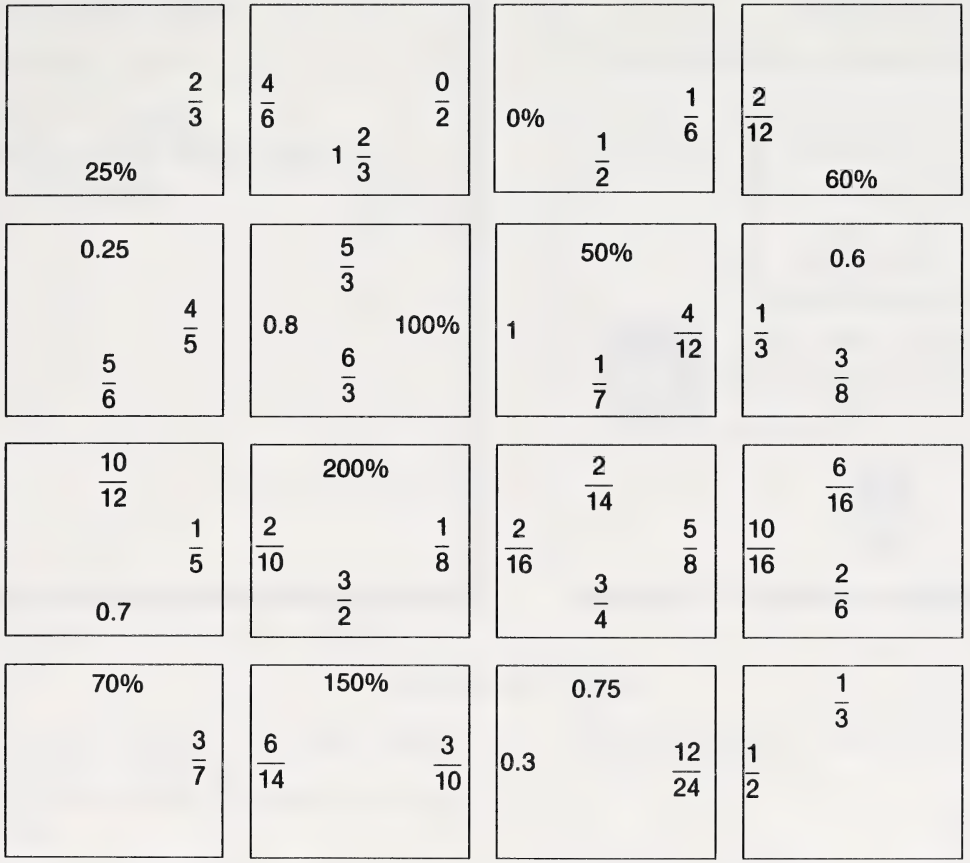
**Guiding the Student**

- Have the student do the Concluding Activities.
- Afterwards help the student check the answers.

## Concluding Activities

## Suggested Answers

Cut out the squares of the percent puzzle at the end of this booklet. Fit them together so that the edges that are next to each other and are up or down from each other name the same ratio.



# FINDING A PERCENT OF A NUMBER

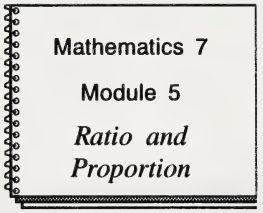
## What Lies Ahead

The student will learn these skills:

- estimating a percent of a number
- finding a percent of a number using paper and pencil methods or a calculator

## Gathering Materials

In this section the student will need these items.



MAC 6 Disk B "Making Sense of Percents"
SRA Computer Drill & Instruction: Mathematics, Level D, "Ratio & Percent" Lesson 17.

## Guiding the Student

- Have the student turn to Section 10 in Module Booklet and read the "What Lies Ahead" box.
- Next have student read "Working Together" and do the Introductory Activities.
- Afterwards help the student to check the answer and correct any errors.

## Introductory Activities

1. Circle the best estimate for each of these percent problems.

   a. 98% of 680

   b. 26% of 399

   c. 33% of 180

   d. 49% of 105

   e. 22% of 450

2. Estimate an answer for each of the following.

   a. 98% of 60

   b. 11% of 750

   c. 22% of 50

   d. 20% of 189

   e. 50% of 59

   f. 82% of 605

## Suggested Answers

1. a. 0.68, 6.8, 68, (680)

   b. 1, 10, (100), 1000

   c. 0.6, 6, (60), 600

   d. 0.5, 5, (50), 500

   e. 0.9, 9, (90), 900

2. Answers may vary because students may round, use front-end digits, or may compensate.

   a. about 59

   b. about 75

   c. about 10

   d. about 40

   e. about 30

   f. about 30

**Computer Alternative**

3. Do the program "Making Sense of Percents" on Disk B of *MAC 6*. Read the instructions in the folder with the disk before using the program.

3. Computer checked.

**Guiding the Student**

- Have the student read "Working Together" and do the Practice Activities.
- Afterwards help the student check the answers and correct any errors.

## Practice Activities

1. The seating capacity of a football stadium is 10 800. At one game 75% of the seats were occupied. How many people were at the football game?

2. About 80% of the nuts in a can of mixed nuts are peanuts. In a handful of 20 nuts, how many peanuts are there?

## Suggested Answers

1. 75% of 10 800 = 0.75 × 10 800 = 8100

   There were 8100 people at the football game.

2. 80% of 20 = 0.80 × 20 = 16

   There are 16 peanuts in a handful of 20 nuts.

3. Find the amount of milkfat contained in 1000 mL of each type of cream in the chart below.

| | Type | Milkfat |
|---|---|---|
| a. | whipping cream | 35% |
| b. | coffee cream | 18% |
| c. | cereal cream | 9% |
| d. | partly-skimmed milk | 2% |

3. a. 35% of 1000 = 0.35 × 1000 = 350

There is 350 mL of milk fat in 1000 mL of whipping cream.

b. 18% of 1000 = 0.18 × 1000 = 180

There is 180 mL of milk fat in 1000 mL of coffee cream.

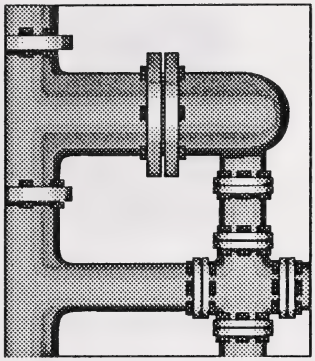
c. 9% of 1000 = 0.09 × 1000 = 90

There is 90 mL of milk fat in 1000 mL of cereal cream.

d. 2% of 1000 = 0.2 × 1000 = 20

There is 20 mL of milk fat in 1000 mL of partly-skimmed milk.

4. Martinez uses solder to fix his pipes. Solder is a mixture of tin and lead. In hard solder 65% of the total mass is tin. Find the amount of lead and tin in a 5 kg bar of hard solder.



4. 65% of 5 = 0.65 × 5 = 3.25

There is 3.25 kg of tin in 5 kg of hard solder.

35% of 5 = 0.35 × 5 = 1.75

or

5 − 1.75 = 3.25

There is 1.75 kg of lead in 5 kg of hard solder.

**Guiding the Student**

- If the student had difficulty with Practice Activities, assign the Extra Practice.
- If the student had success with the Practice Activities, assign the Concluding Activities.

## Extra Practice

### Computer Alternative

1. Do Lesson 17 of the "Ratio and Percent" disk from the Package *SRA Computer Drill and Instruction: Mathematics, Level D.* Read the instructions in the folder with the disk before using the program.

   Remember if you need help, press the SHIFT key and the ? key.

### Print Alternative

2. Calculate each of the following.

   a. 25% of 60

   b. 32% of 90

   c. 21% of 85

   d. 96% of 340

   e. 42% of 1280

## Suggested Answers

1. Computer checked.

2. a. 25% of 60 = 0.25 × 60 = 15

   b. 32% of 90 = 0.32 × 90 = 28.8

   c. 21% of 85 = 0.21 × 85 = 17.85

   d. 96% of 340 = 0.96 × 340 = 326.4

   e. 42% of 1280 = 0.42 × 1280 = 537.6

3. Play "Percent Tic-Tac-Toe[1]." The directions are given below. The game board is in the appendix. You will need two-coloured counters.

   Follow these directions.

   - Two players alternate turns.
   - A player picks two numbers from the number table and computes the percentage one number is of the other. A player who picks 25 and 75 computes 25 percent of 75 or 75 percent of 25.
   - The player then covers an uncovered box on the game board that is closest to his or her answer.
   - The first player to get three in a row (horizontally, vertically, or diagonally) wins.

3. Discuss the game results.

**Guiding the Student**

- Have the student do the Concluding Activities.
- Afterwards check the answers and correct any errors.

[1]National Council of Teachers of Mathematics for excerpts from *The Arithmetic Teacher*, January, 1988, Reston, Virginia.

## Concluding Activities

1. In a plant of 2000 employees, 2% were absent one day. How many employees were present on this particular day?

## Suggested Answers

1. **Method 1**

   100% − 2% = 98%

   98% of 2000 = 0.98 × 2000 = 1960

   1960 employees were present on this particular day.

   **Method 2**

   2% of 2000 = 0.02 × 2000 = 40

   40 employees were absent on this particular day.

   So 2000 − 40 = 1960.

   1960 employees were present on this particular day.

2. 72% of the earth's surface is water. If 25% of the dry land is forested, how much of the earth is forest? Leave your answer as a percent.

2. 100% − 72% = 28%

So 28% of earth is dry land.

25% of 28% = 0.25 × 28% = 7%

So 7% of earth's surface is forested.

3. In the city of Exon, population 40 000, 10% of the population have two computers each, 70% of the remainder have none, and all the others have one computer each. How many computers are there in Exon?

3. There are several ways to solve this problem. Here is one.

**Step One:** 10% of the population have two computers. How many computers is this?

10% of 40 000 = 0.1 × 40 000 = 4000

4000 people have 2 computers. This is 8000 computers.

**Step Two:** 70% of the remaining population have none and all the others have one computer each. How many computers are there in the remaining population?

40 000 − 4000 = 36 000

36 000 people have one computer or none.

70% of 36 000 have none. So 30% of 36 000 have one computer each.

30% of 36 000 = 0.3 × 36 000 = 10 800

10 800 people have one computer each. That is, 10 800 computers.

**Step Three:** Find the total number of computers in Exon.

8000 + 10 800 = 18 800

There are 18 800 computers in Exon.

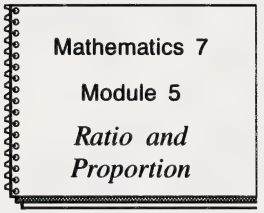
# SUMMARY

## What Lies Ahead

In this summary the student will review the skills taught in Sections 6 to 9.

## Gathering Materials

In this section the student will need these items.



## Guiding the Student

- Have the student turn to the Summary and review the skills taught in Sections 6 to 9.
- Then have the student correct any errors he or she may have made in the Pretest in Section 6.

# MODULE CONCLUSION

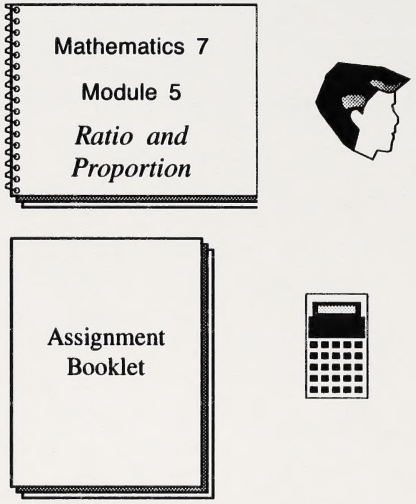
## What Lies Ahead

The student is now ready to do the assignment in the Assignment Booklet.

The student will be graded on the work done in this booklet.

## Gathering Materials

In this section the student will need these items.




## Guiding the Student

- Have the student complete the Assignment. The student may refer to the notes but the Assignment must be done independently.
- Afterwards you should both sign the declaration and you should submit the Assignment Booklet for feedback and a grade.

Mathematics 7

9MA07P55

L.R.D.C.
Producer

FIRST EDITION
1991